VALUATION METHODOLOGIES: A JUDGE'S VIEW*

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At heart, chapter 11 is a simple exercise. In bankruptcy parlance, it is to gather the property of the estate, determine the amount and nature of the claims and confirm a plan of reorganization that distributes the property of the estate to the creditors in accordance with the requirements of the Bankruptcy Code.[1] Inherent in this process is determining the *value* of the property of the estate and the claims. Understanding the methodologies used to determine value is critical for any attorney or judge in this field.[2] The goal of this article is to provide the reader with a basic understanding of the methodologies used to value an asset.

What is the value of an asset or a firm? The standard definition is that the value of an asset is its material or monetary worth, i.e., "the amount of money, goods, etc., for which a thing can be exchanged or traded."[3] Of course, the easiest and most accurate way to determine the amount of money for which an asset can be exchanged is to do just that—exchange the asset for money or, put more plainly, sell it. When one does not wish to sell the asset or simply cannot do so it becomes more difficult to determine the asset's value. Nonetheless, in determining an asset's value the ultimate goal remains the same—to determine as accurately as possible what the sale price would be.[4]

The most obvious method for estimating an asset's potential sale price is to consult the current market price for that asset. Of course, not all assets can be readily bought and sold in a market. For example, while there is a ready market for trading in bushels of wheat there is no such market for wheat farms (if for no other reason that each farm is unique) such that one could consult a market price to determine the farm's value. Even when there is a market it may not fairly estimate

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* The author has relied on a number of sources for the information in this chapter. The primary resource has been Professor Damodaran's excellent treatise on valuation. ASWATH DAMODARAN, INVESTMENT VALUATION: TOOLS AND TECHNIQUES FOR DETERMINING THE VALUE OF ANY ASSET (2d ed. 2002).

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[1] Of course, like most things in life, the devil is in the details!

[2] Valuation issues arise in a number of contexts under the Code. *See, e.g.*, 11 U.S.C. § 361 (2006) (whether adequate protection must be provided and, if so, what type); *Id.* at § 362(d)(1), (2)(a) (whether the automatic stay should be lifted for cause, including lack of adequate protection, or because the debtor lacks equity in the property, respectively); *Id.* at § 506 (determination of secured status); 11 U.S.C. § 1129(a)(7)(A)(ii) (whether the plan satisfies the best interest of creditors test); *Id.* at § 1129(b) (whether the plan satisfies the fair and equitable test).

[3] THE NEW II THE SHORTER OXFORD ENGLISH DICTIONARY 3495 (6th ed. 2007); *see also* BLACK'S LAW DICTIONARY 1690 (9th ed. 2009) ("The monetary worth or price of something; the amount of goods services or money that something commands in an exchange.").

[4] The same principle holds for determining a firm's value as a corporation is nothing more than a collection of contracts operating as a fictitious entity. These contracts, in turn, are a pool of assets and liabilities. The disposition of these assets and liabilities through the corporate entity is controlled by the entity's shareholders, board of directors, management, and/or creditors. *See, e.g.*, FRANK H. EASTERBROOK & DANIEL R. FISCHEL, THE ECONOMIC STRUCTURE OF CORPORATE LAW 15–22, 35 (Harvard University Press, 1st ed. 1991) (describing effect corporate contracts have on firm's valuation).

the potential sale price of an asset if the market is inefficient, disrupted or dysfunctional.

Financial academics and professionals have established a variety of methodologies to determine the value of assets that are not readily valued by reference to a market. Broadly speaking, a firm, its assets and/or its equity can be valued in one of four ways: (i) asset-based valuation where one estimates the value of a firm by determining the current value of its assets, (ii) discounted cash flow or "DCF" valuation where one discounts cash flows to arrive at a value of the firm or its equity, (iii) relative valuation approaches, which include the "comparable company analysis" and the "comparable transaction analysis" that base value on how comparable assets are priced, and (iv) option pricing that uses contingent claim valuation. Other than option pricing, all of these valuation methodologies, either individually or in various combinations, are routinely presented to bankruptcy courts in valuation hearings.[5] No matter which methodology is used, however, the

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[5] Indeed, numerous courts have been presented with and considered these methodologies. *See* Credit Agricole Corporate & Inv. Bank N.Y. Branch v. Am. Home Mortg. Holdings, Inc. (*In re* Am. Home Mortg. Holdings, Inc.), 637 F.3d 246, 258 (3d Cir. 2011) (affirming bankruptcy court's use of discounted cash flow analysis as reasonable determinant of value); Bank of N.Y. Trust Co. v. Pacific Lumbar Co. (*In re* SCOPAC), 624 F.3d 274, 286 (5th Cir. 2010) (affirming bankruptcy court's use of discounted cash flow to determine if collateral declined in value); ASARCO LLC v. Ams. Mining Corp., 396 B.R. 278, 342–63 (S.D. Tex. 2008) (finding discounted cash flow most reliable and comparable companies appproach least reliable for this debtor); Peltz v. Hatten, 279 B.R. 710, 728–34 (D. Del. 2002) (describing experts' valuation methods and calculation of variables in fraudulent conveyance action); *In re* PTL Holdings LLC, No. 11-12676 (BLS), 2011 WL 5509031, at *6–11 (Bankr. D. Del. Nov. 10, 2011) (describing and analyzing valuation of debtor using discounted cash flow, comparable companies and comparable transactions methodologies); *In re* Tribune Co., No. 08-13141 (KJC), 2011 WL 5142420, at *8–12 (Bankr. D. Del. Oct. 31, 2011) (analyzing experts' valuation of debtor using discounted cash flow, comparable companies methodologies); *In re* Chemtura Corp., 439 B.R. 561, 572–90 (Bankr. S.D.N.Y. 2010) (discussing and evaluting discounted cash flow, comparable companies, and precedent transaction valuation methodologies); *In re* DBSD North Am., Inc., 419 B.R. 179, 195–99 (Bankr. S.D.N.Y. 2009), *rev'd on other grounds*, 634 F.3d 79 (2d Cir. 2011) (scrutinizing inaccuracies in experts' discounted cash flow and trading comparables valuations); *In re* Iridium Operating LLC, 373 B.R. 283, 346–52 (Bankr. S.D.N.Y. 2007) (describing and analyzing solvency and adequacy of capitalization using market analysis while rejecting expert's application of discounted cash flow analysis); *In re* Am. Classic Voyages Co., 367 B.R. 500, 509–14 (Bankr. D. Del. 2007) (evaluating debtor's solvency in preference action using discounted cash flow method); *In re* Nellson Nutraceutical, Inc., No. 06-10072 (CSS), 2007 WL 201134, at *22–42 (Bankr. D. Del. Jan. 18, 2007) (inspecting experts' application of discounted cash flow, comparable companies and comparable transactions methodologies); *In re* Nellson Nutraceutical, Inc., 356 B.R. 364, 370–76 (Bankr. D. Del. 2006) (excluding expert's discounted cash flow valuation evidence); *In re* Oneida Ltd., 351 B.R. 79, 87–92 (Bankr. S.D.N.Y. 2006) (detailing investment bankers' valuation methods under discounted cash flow, comparable companies and comparable transactions methodologies to determine plan was fair and equitable); *In re* Med Diversified, Inc., 346 B.R. 621, 630–42 (Bankr. E.D.N.Y. 2006) (holding expert's valuation of debtor inaccurate and inadmissible for using unreliable variables); *In re* Mirant Corp., 334 B.R. 800, 815–20 (Bankr. N.D. Tex. 2005) (assessing debtor's value using discounted cash flow and comparable companies methodologies); *In re* Heilig-Meyers Co., 319 B.R. 447, 458–63 (Bankr. E.D. Va. 2004) (analyzing debtor's solvency in preference action using comparable companies methodology); *In re* Coram Healthcare Corp., 315 B.R. 321, 337–47 (Bankr. D. Del. 2004) (evaluating debtor's going concern value to determine whether proposed plan was fair and equitable using comparable public company analysis, comparable transactions analysis, and discounted cash flow method); *In re* Bush Indus., Inc., 315 B.R. 292, 299–303 (Bankr. W.D.N.Y. 2004) (describing and applying three valuation methods to calculate debtor's enterprise value); *In re* Exide Techs., 303 B.R. 48, 58–66 (Bankr. D. Del. 2003) (discussing discounted cash flow, comparable companies, and comparable

purpose remains the same—to determine as accurately as possible what the sale price would be, which is referred to as "price discovery."

I. ASSET-BASED VALUATION

An asset-based valuation is where one calculates the value of individual assets owned by a firm and aggregates them to arrive at a firm value. There are two primary asset-based valuation models. The first is liquidation value, which is obtained by aggregating the estimated sale proceeds of the assets owned by the firm. The second is replacement cost, where one estimates what it would cost to replace all of the assets that a firm owns today.

Asset-based valuations are different from DCF valuations and of much more limited utility. In liquidation valuation, for example, one looks only at the assets in place and estimates their value based on how similar assets are currently priced in the market. In a DCF valuation, which is discussed more fully below, one considers all the firm's assets *and their expected growth potential* to arrive at value.[6] Only in the instance where (i) a firm does not have any growth assets and (ii) the market accurately reflects expected cash flows in its pricing of the firm's assets will an asset-based valuation result in a similar conclusion as a DCF valuation.

Nonetheless, asset-based valuations are commonly used in chapter 11. For example, under section 1129(a)(7)(A) of the Bankruptcy Code, in order for a debtor to confirm a plan of reorganization it must establish that *each holder* of a claim or interest in an impaired class has either voted for the plan or

> will receive or retain under the plan on account of such claim or interest in property of the value, as of the effective date of the plan, that is not less than the amount that such holder would so receive or retain if the debtor were liquidated under chapter 7 of this title on such date.[7]

As a case under chapter 7 of the Bankruptcy Code involves the liquidation of the debtor's assets, a debtor seeking to satisfy section 1129(a)(7)(A) will often present expert testimony as to the liquidation value of the debtor's assets.[8]

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transactions); *In re* Payless Cashways, Inc., 290 B.R. 689, 698–702 (Bankr. W.D. Mo. 2003) (analyzing debtor's solvency in preference action using comparable companies analysis); *In re* Joy Recovery Tech. Corp., 286 B.R. 54, 77–79 (Bankr. N.D. Ill. 2002) (using comparable companies methodology in fraudulent conveyance action); *In re* Lids Corp., 281 B.R. 535, 541–45 (Bankr. D. Del. 2002) (applying the three valuation methods in preference action); *In re* Zenith Elecs. Corp., 241 B.R. 92, 103–05 (Bankr. D. Del. 1999) (relying on discounted cash flow method to determine whether proposed plan was fair and equitable).

[6] *See* Stan Bernstein, Susan H. Seabury & Jack F. Williams, *Squaring Bankruptcy Valuation Practice with* Daubert *Demands*, 16 AM. BANKR. INST. L. REV. 161, 173 (2008) (describing income approach analysis as dependent upon debtor's financial projections and estimated future cash flows).

[7] 11 U.S.C. § 1129 (a)(7)(A)(ii).

[8] Evidence of replacement value is rarely brought before the courts in chapter 11 cases. *But see* Assocs. Commercial Corp. v. Rash, 520 U.S. 953, 959 n.2 (1997) (stating when a chapter 13 plan proposes to retain

Set forth below is a simple liquidation analysis.

Asset	Book Value	Liquidation Recovery Percentage		Proceeds Available In Liquidation	
		Low	High	Low	High
Cash	$12,500,000	96%	98%	$11,957,000	$12,229,000
Accounts Receivable	$18,000,000	0%	4%	$0	$720,000
Inventory	$180,000,000	94%	106%	$169,200,000	$190,800,000
Property, Plant and Equipment (PPE)	$50,000,000	3%	8%	$1,500,000	$4,000,000
Gross Proceeds				$182,657,000	$207,749,000
Less: Wind Down Expenses				($28,000,000)	($26,000,000)
Net Proceeds				**$154,657,000**	**$181,749,000**

As one readily sees, a liquidation analysis simply lists the various items of assets owned by the debtors, lists a value for each of these assets (usually book value), determines an appropriate recovery percentage based on the difficulty of liquidating the asset, and multiplies the appropriate recovery percentage by the asset's value. Of course, nothing in life is free. This includes liquidating assets. Thus, the analysis must include an estimate of the amount of money required to liquidate the assets.

II. DISCOUNTED CASH FLOW (DCF) VALUATION

The discounted cash flow or DCF valuation has its foundation in the present value rule under which the value of any asset is the present value of expected future cash flows from it. Thus, a basic understanding of the concept of present value is necessary to understand how a DCF analysis works.

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and use collateral, section 506(a) of the Bankruptcy Code directs application of a replacement value standard rather than a foreclosure value standard or something in between. "Replacement value" in this context is equivalent to fair market value, i.e., "the price a willing buyer in the debtor' s trade, business, or situation would pay a willing seller to obtain property of like age and condition." The bankruptcy court, as the trier of fact, is charged with determining the best way of ascertaining replacement value on the basis of the evidence presented). *See generally* Till v. SCS Credit Corp., 541 U.S. 465, 489 (2004) (stating that, under *Rash*, "secured creditors are already compensated in part for the risk of nonpayment through the valuation of the secured claim" because *Rash* "utilized a secured-creditor-friendly replacement-value standard rather than the lower foreclosure-value standard for valuing secured claims when a debtor has exercised chapter 13's cram down option").

A. Present Value

Consider the following simple example. You own a vacant lot worth $100,000. You are considering constructing a gas station on the lot. The cost of construction would be $300,000. You believe that in one year you will be able to sell the gas station for $450,000. If you decide to go forward with construction, you will be investing $400,000 now in the expectation of realizing $450,000 in one year. You should go ahead with the investment if the present value of the expected $450,000 payoff is greater than the investment of $400,000.

The present value of $450,000 one year from now must be less than $450,000. This is because *a dollar today is worth more than a dollar tomorrow* in that a dollar today can be invested to start earning interest immediately. Thus, the present value of the delayed payoff, i.e., the $450,000, may be found by multiplying the payoff by a discount rate, which is less than 1 (if the discount rate were more than one, a dollar today would be worth less than a dollar tomorrow). The discount rate is expressed as the reciprocal of 1 plus a rate of return:

$$\text{Discount rate} = 1/(1 + r)^t$$

The rate of return is the compensation that an investor demands for accepting the late payment. In this formula, r = the rate of return; and t = the term for which the rate is applicable, e.g., one year, two years, etc. The present value of the investment is the amount expected at the end of the term multiplied by the discount rate.

Back to our example. Assume that the $450,000 payment is a sure thing. The gas station is not the only way to obtain $450,000 a year from now. For example, you could invest in United States government securities maturing in a year. Suppose those securities yield 5% interest. How much would you have to invest in order to receive $450,000 at the end of the year? The answer is: $450,000/1.05 = $428,571.42.[9] Thus, the present value of the gas station is $428,571.42. Although the building is worth $428,571.42, that doesn't mean you are $428,571.42 better off. Recall, you committed $400,000 to construct the building. Thus, the net present value of the gas station is $28,571.42, i.e., $428,571.42 - $400,000, and you should go ahead with the investment.

Now, assume that all the above facts are the same, but you know that the gas station will be worth $450,000 at the end of *two years*. How does this change the result? The answer is $450,000/(1.05)^2 = $450,000/1.1025 = $408,163.27.[10] Thus,

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[9] The discount rate = $1/(1 + r)^t = 1/(1 + 0.05)^1 = 1/1.05$. The present value = $450,000 * (1/1.05) = $450,000/1.05.

[10] Again, the discount rate = $1/(1 + r)^t$. Because, you will not receive the payment for two years, you must square the denominator since the 5% in the example is the annual rate. This is nothing more than an extension of the principle that a dollar today is worth more than a dollar tomorrow: *a dollar next year is worth more than a dollar in two years*. So, the discount rate = $1/(1 + r)^t = 1/(1 + 0.05)^2 = 1/1.1025$. The present value = $450,000 * (1/1.1025) = $450,000/1.1025.

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the net present value of the gas station in two years is $8,163.27 and, once again, you should go ahead with the investment.

Finally, in the above scenario we made an unrealistic assumption that you can be certain that the gas station will be worth $450,000 in one year. In fact, while that may be your best estimate, there is no way to be certain that the building will be worth that much next year. However, it is virtually assured that the purchase of $428,571.42 worth of United States securities will be worth $450,000 next year. Thus, because *a safe dollar is worth more than a risky dollar* you must use a discount rate greater than the risk free rate of return, i.e., the 5% return on investment in United States securities. Of course, some investments are riskier than others. Constructing the gas station is riskier than investing in government securities but probably less risky than investing in a start-up biotechnology company. So, let's assume that an appropriate discount rate that reflects the risk involved in constructing the gas station is 10%. What is the net present value of the gas station? The answer is $9,099.91, i.e. $450,000/1.10 = $409,099.91 minus the $400,000 initial investment, and you should go ahead with the investment.[11]

B. The Goal of a Discounted Cash Flow Valuation

The goal in a discounted cash flow valuation is to estimate the "intrinsic value" of an asset based on its fundamentals. Intrinsic value is the value that would be attached to the firm by an all-knowing analyst who not only estimates the expected cash flows correctly but also attaches the right discount rate to these cash flows and values them with absolute precision. Of course, precisely determining intrinsic value is impossible, especially with companies that have a substantial uncertainty about their future.

C. The Elements of a Discounted Cash Flow Valuation

The elements of a discounted cash flow valuation are no different from those discussed above concerning net present value, although their derivation and application are much more complex. Basically, a discounted cash flow valuation consists of an estimate of the firm's future cash flows discounted to present value. The complicating factors include determining by what metric one determines the firm's future cash flows, from what source one draws the future cash flows, and how one calculates the appropriate discount rate. Indeed, these issues are so sufficiently complex as to almost certainly require that the valuation be performed by an expert in the field.

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[11] If we go back to the previous example where the gas station will be worth $450,000 in *two years*, we finally come to the point where the net present value of the investment is negative and you should *not* go forward: PV = $450,000/1.10^2 = $450,000/1.21 = $371,900.83. NPV = $371,900.83 - $400,000 = **-$28,099.17.**

Generally speaking, there are three types of discounted cash flow valuations: (i) valuing just the equity stake in the business; (ii) valuing the entire firm, which includes equity and the other claimholders in the firm such as bondholders, preferred stockholders, etc.; and (iii) valuing the firm in pieces beginning with its operations and adding the effects on value of debt and other non-equity claims. Although all three approaches discount expected cash flows, the relevant cash flows and discount rates are different under each.

The value of equity is obtained by discounting expected cash flows to equity, i.e., the residual cash flows after meeting all expenses, reinvestment needs, tax obligations, and interest and principal payments, at the cost of equity, i.e., the rate of return required by equity investors in the firm. Often, this is done by discounting expected dividends to shareholders.

The value of the firm is obtained by discounting expected cash flows to the firm, i.e., the residual cash flows after meeting all operating expenses, reinvestment needs, and taxes, but prior to any payments to either debt or equity holders, at the weighted average cost of capital ("WACC"). WACC is the cost of the different components of financing used by the firm (equity, preferred stock, and/or debt) weighted by their market value proportions.

Finally, the value of the firm can also be obtained by valuing each claim on the firm separately. In this approach, which is called adjusted present value ("APV"), one begins by valuing equity in the firm, assuming that it was financed only with equity. One then considers the value added (or taken) away by debt by considering the present value of the tax benefits that flow from debt and the expected bankruptcy costs. One advantage of this approach is that different cash flows to the firm may be discounted at different rates based upon the specific cash flow's riskiness.

Although all three approaches use different definitions of cash flow and discount rates, they should yield consistent estimates of value as long as one uses the same set of assumptions and valuation. The key error to avoid is mixing apples and oranges by mismatching cash flows and discount rates. For example, discounting cash flows to equity at the cost of capital will lead to an upwardly biased estimate of the value of equity while discounting cash flows to the firm at the cost of equity will yield a downwardly biased estimate of the value of the firm**.**

D. Using a DCF to Value the Firm

Of the three DCF approaches discussed above, by far the most commonly used before bankruptcy courts is that of valuing the firm by discounting expected cash flows to the firm at the weighted average cost of capital or WACC.[12] The expected cash flows to the firm used in this valuation are generally referred to as the "free cash flow to the firm" or "FCFF." A number of metrics are used to calculate the

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[12] Bernstein et al., *supra* note 6, at 187 (stating discounted expected cash flow using WACC among most common and well-accepted approach).

FCFF. These include the "un-levered cash flow," which is the firm's earnings before interest and taxes, net of taxes and reinvestment needs. Another measure of FCFF that is widely used in valuation is the firm's earnings before interest, taxes, depreciation, and amortization ("EBITDA"). Other measures are earnings before interest and taxes ("EBIT"); net operating profit or loss after taxes ("NOPLAT"); or the net operating income ("NOI").

The cash flows themselves usually come from management's estimates of the firm's future performance. As such, they are necessarily subject to uncertainty relating to matters specific to the firm as well as to broader issues such as the general state of the economy, advances in technology, effectiveness of management, labor issues, actions of competitors, price of raw materials, etc.[13] Given the inherent uncertainty in predicting the future, one generally only uses three to five years of projections in performing a DCF analysis. The final year is used to calculate a "terminal value," which is the value of the firm as of the date of the last estimate. For example, were one to use management projections for the next five years to perform a DCF, the estimate of the firm's performance in that fifth year would be used to calculate the value of the firm as of that fifth year, i.e. its terminal value. Generally, that is performed by assuming that the cash flows of the firm at that fifth year will grow at a constant rate forever beyond that time. One simply calculates the present value of that perpetual growth as of the fifth year and then calculates the present value as of the date of the valuation of that conclusion.[14]

As mentioned briefly above, the discount rate used in valuing the firm as a whole is usually the WACC. The WACC is designed to reflect the cost of capital of the firm being valued. Firms generally have three ways to raise capital. They are in the increasing order of riskiness for the investor: debt, preferred stock, and equity. Of course, as riskiness increases the rate of return required by the investor also increases. Thus, the cost of capital to the firm is less for debt than it is for preferred stock and, in turn, both debt and preferred stock are cheaper, i.e., they have a lower cost of capital, than equity.

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[13] In addition, the projections may be manipulated by management to favor its interests or those of others "friendly" to management. *Compare In re* Nellson Nutraceutical, Inc., No. 06-10072 (CSS), 2007 WL 201134, at *19 (Bankr. D. Del. Jan. 18, 2007) ("In sum, [the controlling equity holder] utilized its control over [the debtor] to manipulate both the business planning and valuation processes to come up with an artificially inflated enterprise value in order to claim some residual value for their existing equity position.") (emphasis in original deleted), *with In re* PTL Holdings LLC, No. 11-12676 (BLS), 2011 WL 5509031, at *3 (Bankr. D. Del. Nov. 10, 2011) ("The financial projections at the heart of this valuation exercise were prepared by the Debtor's management team. The [objecting junior secured lender, which will not receive a recovery under the proposed plan,] strongly criticizes those projections as being premised on unduly pessimistic and faulty assumptions, and contends that the projections were manufactured to produce a valuation that places [the objector] out of the money. The Court finds, however, that the record developed at trial does not support [the objector's] criticism.").

[14] The firm's terminal value can have a significant if not dominating influence on the ultimate conclusion as to the firm' s value. As such, an error or manipulation in calculating terminal value can alter the valuation significantly.

The formula for the WACC is, in and of itself, not particularly complicated. The formula is as follows:

$$\text{WACC} = \text{Cost of Equity } [\text{Equity}/(\text{Debt}+\text{Equity})] + \text{Cost of Debt } [\text{Debt}/(\text{Debt}+\text{Equity})]$$

$$\text{Cost of Debt} = \text{Pretax Rate of Debt } (1\text{-Tax Rate})$$

Of course, the devil is in the details! To conclude, set forth below is a **simple** example of a DCF analysis of both the value of a firm's equity and the value of a firm.

Assume one is analyzing the company with the following cash flows for the next five years. The value of debt outstanding is $800 and the firm can borrow long-term at 10%.

Year	Cash Flow to Equity	Interest (Long-Term)	Cash Flow to Firm
1	$50	$40	$90
2	$60	$40	$100
3	$68	$40	$108
4	$80	$40	$120
5	$85	$40	$125
Terminal value	$1,600	N/A	$2,360

Assume also that the cost of equity is 13%. The tax rate for the firm is 50%.

$$\text{Cost of Debt} = \text{Pre-Tax Cost of Debt } (1 - \text{Tax Rate})$$

$$\text{Cost of Debt} = 0.1 \ (1\text{-}0.5) = 0.05 = 5\%$$

$$\text{PV of equity}^{15} = (50/1.13) + (60/1.13^2) + (68/1.13^3) + (80/1.13^4) + [(85+1,600)/1.13^5]$$

$$\text{PV of equity} = 44.25 + 46.99 + 47.13 + 49.07 + 914.55 = \$1,101.99$$

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[15] This is nothing other than a simple calculation of the present value of the cash flow to equity (column 2 above) using a discount rate of the cost of equity, i.e., 13%. As the cash flows go further out in time the discount rate is increased. For example, the rate of return for the fifth year must be raised to the fifth power, e.g., 1.135. For more detail see Section II(a) above.

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$$\text{WACC} = \text{Cost of Equity [Equity/(Debt+Equity)]} + \text{Cost of Debt [Debt/(Debt+Equity)]}$$

$$\text{WACC} = .13[1{,}101.99/[(800+1{,}101.99)] + .05[800/(800+1{,}101.99)]$$

$$\text{WACC} = .13[0.579] + .05[0.421] = 0.075 + 0.021 = 0.096 = 9.6\%$$

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$$\text{PV of firm}[16] = (90/1.096) + (100/1.096^2) + (108/1.096^3) + (120/1.096^4) + (125+2{,}360)/1.096^5]$$

$$\text{PV of firm} = 82.12 + 83.25 + 82.03 + 83.16 + 1{,}571.35 = \$1{,}901.99[17]$$

III. RELATIVE VALUATION

In relative valuation, the value of an asset is derived from the pricing of comparable assets, standardized using a common variable such as earnings, cash flows, book value, or revenues. Unlike discounted cash flow valuation, which is a search for intrinsic value, relative valuation relies more on the market. In other words, one assumes that the market is correct in the way it prices assets and firms on average, but that it makes errors on the pricing of individual assets and firms.

Finding similar and comparable assets and/or firms is the challenge of a relative valuation. Frequently one has to accept firms that are different from the firm being valued in one dimension or the other. In such a case, one has to either explicitly or implicitly control for the differences. In practice, controlling for these variables can range from the simple—such as using industry averages—to the very sophisticated—such as multi-variant regression models.

Multiples are simple and easy to relate to. They can be used in a relative valuation to obtain estimates of value quickly for firms or assets, and are particularly useful when a large number of comparable firms are being traded on financial markets and the market is, on average, pricing these firms correctly. They tend to be more difficult to use to value unique firms with no obvious comparables, with little or no revenues, or with negative earnings.

By the same token, multiples are also easy to misuse and manipulate, especially when comparable firms and comparable transactions are used. Given that no two firms are exactly alike in terms of risk and growth, the definition of comparable firms is a subjective one. Consequently, a biased analyst can choose a group of

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[16] This is a simple calculation of the present value of the cash flow to firm (column 4 above) using a discount rate of the WACC, i.e., 9.6%. Again, for more detail see Section II(a) above.

[17] Note that the value of the firm's equity is approximately equal to the value of the firm minus the market value of the debt ($800). Indeed, the numbers should be identical. The slight difference here is due to rounding of the figures in order to simplify the example.

comparable firms to confirm his or her biases about a firm's value. Another problem with using multiples based on comparable firms or comparable transactions is that the market might be making errors in valuing the comparable firms. For example, if the market is overvaluing all computer software firms, using the average price to earnings ratio of these firms to value an individual computer software firm will lead to an overvaluation.

The two most common relative valuation methodologies used in chapter 11 cases are the comparable companies analysis and the comparable transactions analysis.[18] Under both methods, one determines a metric by which to value the company such as EBITDA. One then looks to either comparable publicly-traded companies or control transactions involving comparable companies to determine the appropriate multiple to apply to the selected metric to reach a conclusion of the subject firm's value. For example, one may conclude that the firm is worth 8.5 times its trailing 12 month EBITDA.

Both these methods are discussed more fully and an illustration for each is provided below.

A. Comparable Companies Analysis

Under the comparable companies analysis, value is calculated by examining the trading ranges of comparable publicly-traded companies. Public companies are used because they are the only ones for which economic data (stock value, revenue, EBITDA, EBIT, etc.) is readily available. Trading ranges are viewed as a multiple of a performance metric, generally revenues, EBITDA, or EBIT. The multiples are then applied to the same metric of the company being evaluated in order to determine its value. The more similar the guideline or comparable companies are, the more supportable is the use of the comparable companies method. Use of companies that are clearly not comparable will lead to unsupportable conclusions.

Now for a simple illustration. Assume you are performing a comparable companies analysis on a glass manufacturing company in bankruptcy. The metric you chose as a determinant of value is the company's EBITDA for the last 12 months (LTM EBITDA), which is $40 million.

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[18] *See* Stan Bernstein, Susan H. Seabury & Jack F. Williams, *The Empowerment of Bankruptcy Courts in Addressing Financial Expert Testimony*, 80 AM. BANKR. L.J. 377, 408 (2006) (recognizing comparable company and comparable transaction methods as "standard methodologies" of valuation).

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You determine that the following companies are comparable:

Company	Stock Price	No. of Shares	Market Capitalization (Stock Price x No. of Shares)	LTM EBITDA	Multiple of Market Capitalization to LTM EBITDA
Acme Glass Co.	$10.00	75 million	$750 million	$50 million	15.0
Bird Glass, Inc.	$12.50	100 million	$1.25 billion	$80 million	15.6
Campbell Glass, Inc.	$5.00	100 million	$500 million	$65 million	7.7
Delta Glass, Inc.	$20.00	150 million	$3 billion	$150 million	20.0
				Mean	**14.6**
				Median	**15.3**

Applying the mean multiple of the comparable companies, which is 14.6, to the debtor's LTM EBITDA of $40 million results in a value of $584 million. Applying the median multiple of the comparable companies, which is 15.3, to the debtor's LTM EBITDA of $40 million results in a value of $612 million. Thus, the value of the debtor under the comparable companies analysis is between $584 million and $612 million.

B. Comparable Transactions Analysis

Under the comparable transactions analysis, value is determined by examining the consideration paid to acquire a comparable entity through a publicly reported merger or acquisition. Like the comparable companies analysis, the purchase price is viewed as a multiple of an appropriate earning measure (revenue, EBITDA, or EBIT).[19] Value is calculated by applying the resulting multiple to the same metric of the company being evaluated. Like the comparable companies analysis, the more similar the target company is to the firm being valued, the more confidence one can place in the valuation.

Now for a simple illustration. Assume you are performing a comparable transactions analysis on the glass manufacturing company discussed above. The metric you chose as a determinant of value is again the company's EBITDA for the last 12 months (LTM EBITDA), which is $40 million.

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[19] *See* Bernstein et al., *supra* note 6, at 195 (providing overview of factors in comparable transactions analysis).

You determine that the following transactions are comparable:

Purchaser	Target Company	Purchase Price	LTM EBITDA	Multiple of Purchase price, i.e., value, to LTM EBITDA
Johnson Conglomerate, Inc.	Zeta Glass Corp.	$200 million	$20 million	10.0
Omni Corp.	Yellow Mountain Glass, Inc.	$600 million	$80 million	7.5
Mega-Company, Inc.	X-Ray Glass	$400 million	$80 million	5.0
Monopoly, Inc.	Veri-Glass Corp.	$1.2 billion	$100 million	12.0
			Mean	**8.6**
			Median	**8.75**

Applying the mean multiple of the comparable transactions, which is 8.6, to the debtor's LTM EBITDA of $40 million results in a value of $344 million. Applying the median multiple of the comparable companies, which is 8.75, to the debtor's LTM EBITDA of $40 million results in a value of $350 million. Thus, the value of the debtor as determined by the comparable transactions analysis is between $344 million and $350 million.

IV. CONTINGENT CLAIM VALUATION

A contingent claim or option is a claim that pays off only under certain contingencies —if the value of the asset exceeds a pre-specified value for a call option or is less than a pre-specified value for a put option. The premise underlying the use of option pricing models in valuation is that discounted cash flow models tend to understate the value of assets that provide payoffs that are contingent on the occurrence of an event. For example, consider undeveloped oil reserves. One could value this oil reserve based on expectations of oil prices in the future but this estimate would miss the fact that the oil company will develop the reserve only if oil prices go up and will not if oil prices decline. An option pricing model would yield a value that incorporates this right.

The use of option pricing models in valuation is a relatively new technique and continues to develop.[20] Although there are instances in a bankruptcy when the use of option pricing might be appropriate, such as a start-up pharmaceutical company that is awaiting an FDA decision as to whether its only asset can be brought to market, option pricing is very rarely used in chapter 11 cases.

V. REACHING A CONCLUSION

Courts have consistently held that the use of actual market data is the preferred method to value an asset.[21] The use of market prices when available and appropriate is entirely consistent with valuation theory. Recall that in using a valuation methodology such as a DCF analysis, the purpose is to determine as accurately as possible what the sale or market price would be, i.e., "price discovery." In the majority of instances in chapter 11 in which valuation is implicated, however, market data will be unavailable or inapplicable.

Hence, in most valuations in chapter 11, the financial professional will perform a DCF, comparable company and comparable transaction analysis. Indeed, these methods are often referred to as the "standard" methodologies.[22] The financial professional then assigns a weight to each of these methodologies based on his or her judgment as to their relative merits and by performing a specific valuation. As with the selection of comparable companies and transactions, the decision as to weighing the three methodologies is a subjective one. The financial professional then applies those weights to come up with a conclusion of value. Usually the valuation conclusion is expressed in a range of values. For example, a professional may determine that a firm is worth between $100 million and $130 million.

Now for our final illustration. Assume a financial professional performs a DCF, comparable companies and comparable transaction analysis and reaches the following conclusions.

Method	Low	High	Mean
DCF	$100 million	$120 million	$110 million
Comparable Companies	$90 million	$100 million	$95 million
Comparable Transactions	$150 million	$185 million	$167.5 million

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[20] *See In re* Capmark Fin. Grp. Inc., 438 B.R. 471, 497 (Bankr D. Del. 2010) (discussing expert's use of valuing guaranty as put option).

[21] *See, e.g.*, VFB LLC v. Campbell Soup Co., 482 F.3d 624, 632–33 (3d Cir. 2007) ("Absent some reason to distrust it, the market price is a more reliable measure of . . . value than the subjective estimates of one or two expert witnesses.") (internal quotations omitted).

[22] *See, e.g., In re* Chemtura Corp., 439 B.R. 561, 573 (Bankr. S.D.N.Y. 2010) (describing DCF, comparable companies and comparable transactions methodologies as "standard").

As you can see, there is a wide range of valuation conclusions between $90 million and $185.5 million.[23] The financial professional concludes that each valuation methodology should be given equal weight and reaches the following conclusions:

Method	Weight	Low	High	Mean
DCF	33.3%	$100 million	$120 million	$110 million
Comparable Companies	33.3%	$90 million	$100 million	$95 million
Comparable Transactions	33.3%	$150 million	$185 million	$167.5 million
Conclusion		$113.2 million	$134.9 million	$124.1 million

Thus, the financial professional determines that the value of the firm is between $113.2 million and $134.9 million with a mean of $124.1 million.

Now, using the same raw data, the financial professional determines that the comparable transactions analysis is of limited utility because he was able to identify only a few comparable transactions. At the same time, he determines that the DCF analysis is particularly reliable because he has a high level of confidence in the discount rate he applied. Thus, he adjusts the weight of the methodologies and reaches the following conclusions.

Method	Weight	Low	High	Mean
DCF	50%	$100 million	$120 million	$110 million
Comparable Companies	35%	$90 million	$100 million	$95 million
Comparable Transactions	15%	$150 million	$185 million	$167.5 million
Conclusion		$104 million	$122.75 million	$113.4 million

In this instance the financial professional concludes that the value of the firm is between $104 million and $122.75 million with a mean of $113.4 million. This compares with a range of between $113.2 million and $134.9 million with a mean of $124.1 million when the methodologies are weighted equally. One can readily see that the adjustments in the weight in the second example result in a slightly lower conclusion of the firm's value.[24]

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[23] The low value of the comparable companies analysis and the high value of the comparable transactions analysis, respectively.

[24] $113 million vs. $124.1 million.

VI. THE COURT

It is important to remember that bankruptcy judges have become familiar and comfortable with the DCF, comparable companies and comparable transactions methodologies.   Indeed, these methods are often referred to as the "standard" methodologies.[25] Of course, there are other valuation methodologies such as contingent claim valuation.   While use of an "alternative" valuation may be appropriate, one should be reluctant to depart from the familiar. The judge will be inherently suspicious of the use of such an alternative valuation. The valuation professional should be prepared to provide a clear reason for not using the DCF, comparable companies and/or comparable transactions methodologies. Otherwise, the judge may suspect that the professional is manipulating the valuation to reach a predetermined result and, thus, will give the valuation little or no weight.

In addition, when using an "alternative" valuation one risks confusing the judge. Remember, most bankruptcy judges are "self-taught" in corporate finance. The financial professional should be prepared to provide a clear explanation of the valuation methodology.   A more careful and complete explanation than that required when using the DCF, comparable companies and comparable transactions methodologies will be necessary. If the judge is confused or does not understand the methodology he or she will likely give the valuation little or no weight.

Finally, in performing valuations, financial professionals often make "adjustments" to the selected methodology. For example, a financial professional may add an additional "risk premium" to the WACC in performing a DCF valuation. As with the use of "alternative" valuation methodologies, judges are inherently suspicious of these adjustments. The concern is that the adjustment is being made to manipulate the valuation to reach a predetermined result. This is particularly the case when all of the adjustments tend to move the conclusion of value in favor of the financial professional's client. Thus, a financial professional making such an adjustment should be prepared to provide a clear reason for it. In addition, one should be prepared to defend that adjustment on cross examination. The simple solution is to make as few adjustments as possible.

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[25] *In re Chemtura Corp.*, 439 B.R. at 573.